FEE·FI·FO·FUM!

MAY 1977

DRIVER

A YANK TANK IN ENGLAND

DRIVER

A Yank-Tank

Driving in England

by TSgt DAN DOHERTY
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Andrews AFB, DC 20330

Do you think your driving habits might get you in trouble if your car was suddenly twice as long and the steering wheel was moved to the passenger side?

In a way, that's how standard American cars seem today to their American drivers who've taken them to England. European cars are about half the size of most American-made automobiles. Naturally, most everything concerning automobiles has been designed accordingly.

A Case In Point. Like many servicemen and women, USAF Master Sergeant John Temple was overjoyed when he received orders for a new assignment at Lakenheath Air Base, England. Temple has had many transfers during his long career and was eagerly anticipating his tour in Great Britain. He figured that traditions are relatively similar to those in the U.S.A. and there is a common language. Temple – like many of his military predecessors – hadn't considered the driving differences in England. So he shipped his car.

He could hardly wait for the arrival of his magnificent 20-foot-long station wagon. The day it came he jumped behind the wheel and buckled up. His second mistake was starting the car and taking off for a spin around the block. At the intersection he had to stop for a light. It was then that he realized he was driving on the left side of the roadway – quite proper and expected over there.

Signaling for a right turn, Temple casually turned in that direction – but instead of ending up on the left side of the road, he was on the right. He had followed his American driving habits. The bus which was heading straight for his car was not about to give up any ground. It was then that it dawned on him he wasn't driving in Brooklyn.

"It takes about a week to get used to this backward-way of doing things. The British drivers say we Americans are the backward ones. All I can say is that driving here in England sure is different," Temple says.

His next rude awakening happened a few days later when he tried to pass a truck while on a drive in the country. The truck was doodling along on this not-very-wide country road and Temple started to pull out a little – eager for a peek around the slow-moving obstruction ahead of him. A blaring horn and a violent maneuver to escape a head-on collision – Temple's heart once again began beating as his car scurried in behind the truck.

"You see this grey hair," he pointed out, "it turned at that moment," Temple said. "Pulling out to pass a truck while alone in an American car and driving in the gutter is like playing Russian Roulette. The only way you can see around something like a truck from your left-hand-drive car is by having someone you trust beside you in the passenger seat who will be your second pair of eyes. When I slow down and drop back far enough to see around a truck, over-eager drivers pass me and fill up the space – putting me so far behind the truck that I feel it's an accomplishment to get back to my original position.

"I used to go out on Sunday afternoons in the States – driving out in the country with my family – taking in the sights and relaxing. Not any

continued

(far left) **Two British cars** pass in normal traffic on a road outside Mildenhall Air Base.

(near left) **An American** car on the same road. Note driver on left side.

(far left) **Driver** of a small British car passes a VW.

(near left) **Here is Temple's car.** Compare the widths.

DRIVER

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THE EDITOR SPEAKS

DOUBLE CLUTCH

CARS AND GASOLINE

When the oil crisis hit home in 1973, the average new car was getting between 12 and 13 miles per gallon. By 1975, fuel efficiency of the average new car had jumped to 15.8 miles per gallon. The average efficiency of 1977 model cars is about 18.6 mpg, allowing motorists to go nearly five miles farther on a gallon of fuel than they could just three years ago.

The average energy efficiency of *all* cars on the road has risen from a low of 13.1 miles per gallon in 1973 to 13.53 miles per gallon in 1975.

How has this improvement in fuel efficiency affected consumption? The Highway Users Federation expects highway travel to increase by .6 trillion vehicle miles between 1976 and the year 2000, but fuel use (which historically has gone up at about the same rate as travel) will remain fairly steady.

While better mileage is a big factor in leveling off fuel consumption, other conservation measures have contributed to easing demand: For instance, the 55 mile-per-hour speed limit saved about two billion gallons of gas in its first 18 months. Ride sharing has the potential of saving 10.5 million gallons of gas *per day*, while recently enacted laws permitting right turns on red lights are saving even more.

Americans have relied on technology to solve critical problems, and this is especially true of efforts to cut fuel use. But in spite of the progress the auto industry has made to meet demands for better fuel economy, technology will not be the whole answer this time. It must be combined with other conservation measures.

If a little thing like right turn on red can save great amounts of fuel . . . if an increased efficiency of less than one-half mile per gallon for all cars (13.1 mpg in 1973 versus 13.53 mpg in 1975) can save billions of gallons . . . then think what you can contribute by practicing smooth starts and by combining errands to eliminate a few unnecessary trips every week. A little bit from everybody adds up to a lot.

(left)
The center line is in close to the right side of the car although the left side is in the gutter.

more! My nerves receive the workout of their lives each time I sit behind the wheel. Leaning back and relaxing is a thing of the past. You always have to be on your toes and you're never able to see the countryside. I keep wondering while driving 'Is this the road that someone is going to try and kill me on?' I will admit,'' he continued, ''that driving on the super highways is somewhat easier, but there aren't that many here.''

Length Counts. Tweet (T-37) is about 30 foot long. A C-141 is about 145 feet long. Even pilots know you can't park a Starlifter in the space normally occupied by a Tweet.

The average length of an English-made auto is between 12 and 15 feet and parking spaces are designed accordingly. It goes without saying that a 20-foot station wagon won't fit.

''When I park the wagon in town, I usually take up two parking spaces,'' Temple says. ''Sometimes I haven't any other choice – and I'll tell you, it doesn't make you too many English friends.''

Parking space in English cities is at a premium, just as it is in the U.S.A. Triple-decker parking garages are cropping up more and more throughout England. Owners of big American cars are presented with a challenge when trying to use these garages. The spiralling-turns within the structures have been designed to accommodate the 15-foot car. Driving a 23-footer around these hair-pin turns is nearly impossible. In most instances, drivers must use the old back-and-forth trick several times before clearing the walls with unscathed fenders. Once parked on the top level (in two spaces), the driver can ponder the thought that what goes up must come down.

Cyclists must beware of the draft caused when a large car passes close to them.

''Within an area of 50 miles or so of the American air bases over here,'' Temple says, ''the English drivers are used to American cars – even the big camper trucks. But I don't have to drive too far from this vicinity before I'm in a town whose population seldom sees our cars. If I drive through a town – just creep through it, really – the people crowd around the car for a look-see. I've had some people pull alongside my car with theirs – matching their front bumper and speed to mine. The person in their back seat is looking at the people in my front

continued

BURY ST. EDMUNDS
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FREE HOUSE
PAC

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(left)
Temple's car starting to edge out for a look-see around a parked bus. Because his steering wheel is on the left, he won't be able to see until he is all the way out in the middle of the street.

(above)
Turning into a small side street is much more difficult with the American full-size model. He has no turning room. Temple has to wait in the middle of the street until cars clear side street or back up to let him in.

seat. The curiosity of the towns folk often causes a traffic jam. Yes – there are some reactions from the British."

Driving on the extreme inside portion of the road also takes some getting used to. "One must learn the ins and outs of driving in the gutter," Temple explains. "It certainly offers one a challenge. Of course, there is one distinct advantage in having the steering wheel on the left over here – the driver always knows where the edge of the pavement is!"

The British call the larger American cars "Yank-Tanks." No one seems to know where the term originated. However, all seem to agree that it likely was first spoken aloud in the heat of an argument between an American driver and a frustrated Englishman.

Americans are not the only drivers who have moments of terror, of course.

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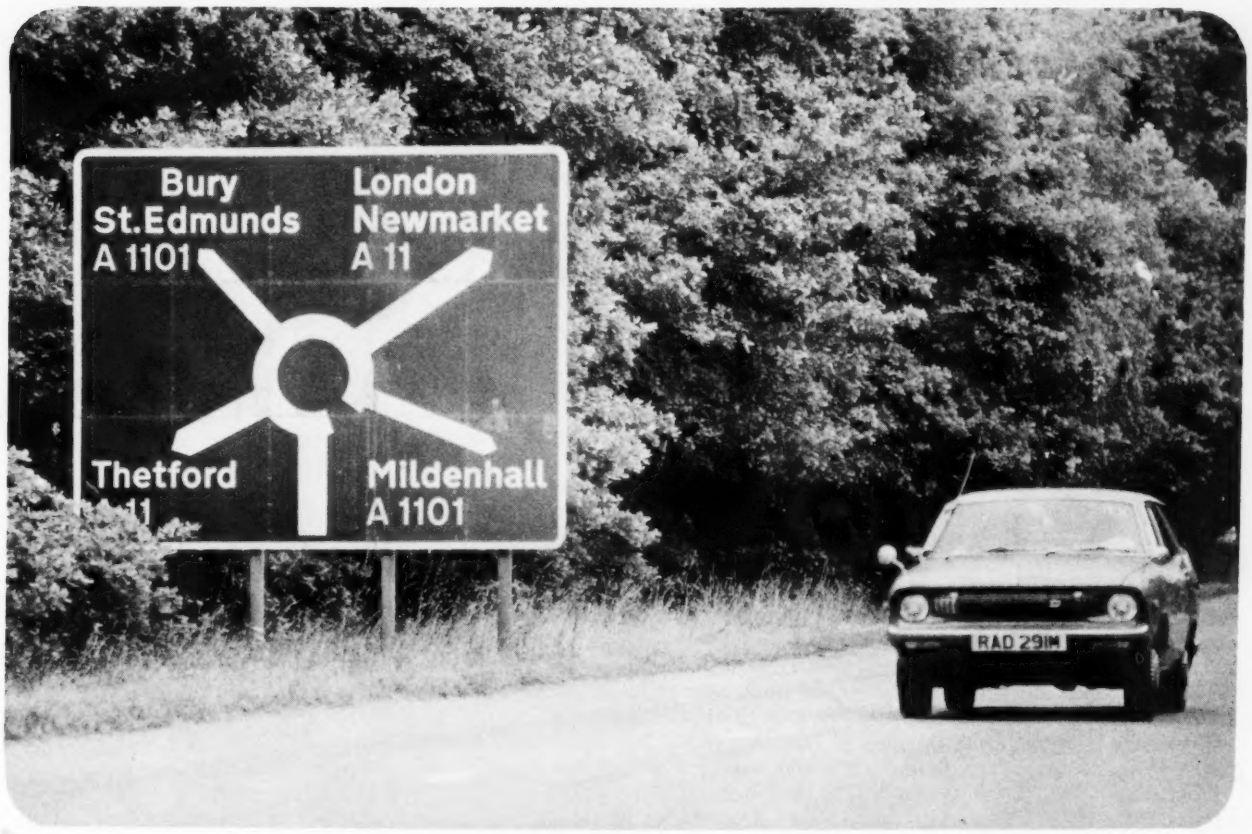


That British invention, the round-a-bout (traffic circle).

Parked cars are a real problem—they obstruct the left-hand-car driver's vision and complicate matters more than a little.

(right)
Here's a typical English parking lot. Notice the differences in car sizes.

Typical direction marker.

Without realizing how long a car can be, the Britisher unwarily pulls out into the right lane – a routine matter – attempting to pass. The driver has made allowances for a 15-footer. Then, too late – for him – he realizes he is trying to pass an American car that seems to be a football field long. Most American drivers have witnessed these near-miss situations.

The country roads in England are narrower than those in the U.S.A., yet most travel in Great Britain must be accomplished on these rural arteries. The British simply have not crisscrossed their nation with interstate highways as Americans have.

Police Sergeant Robert Gattlin of Suffolk, Mildenhall Constabulary has investigated a number of mishaps between American and British cars. He says, "A large and small car have to crawl past each other out there in the country. When a large car meets a truck, one of them must go off into the weeds and that's usually determined by who's bigger." He says that a normal road in England measures 22 feet across. Country roads measure about 18 feet, slightly more than the total length of a European-size car. "The roads out there are just too narrow for the bloody American cars," he concludes.

Narrow Bridges. Numerous streams wind their way lazily through the picturesque British countryside. Unfortunately, General Motors and Chrysler were never given a thought when the bridges which span these waterways were built. Two British cars can inch by each other, providing a certain degree of caution is taken. But American cars must wait until the bridges are clear, just as trucks and buses do. Americans must learn patience while in England, for they do a lot of waiting.

The rural residents, particularly the older folks, rely mainly on the bicycle for transportation. Cyclists usually pay particular attention to the type of vehicle approaching. Trucks, buses or large cars create a draft of air. It is not uncommon for cyclists to alight and wait until a truck has passed. But they don't realize the mass of the American car so they keep on pedaling. The wobble created by the car as it passes close to the bike has toppled many a cyclist and educated all. Temple says, "I also drive a motorcycle over here and I know. I always keep an eye out behind me for Americans just as I do for trucks because I know I could go sailing off to some unintended destination!"

In the U.S.A., if a driver violates a traffic regulation and survives the incident – assuming he or she goes unobserved by the watchful eye of the

a yank-tank in england

continued

It WAS the main road to Liverpool, mate. Now it's the flippin' 'American Cousin Turn-About.'

continued

law – he can consider the matter closed. Not so in Britain. The law is the law and violators can expect a severe tongue-lashing from the nearest observer, be he policeman or not. The average Britisher believes the laws were made for a purpose and violators of traffic laws will be told of their infractions by anyone who notices.

Fuel Costs More. One of the most important considerations that should be made prior to shipping the Yank-Tank over to England is the economics involved. Temple reports, "It costs me between $35 and $50 to fill up this gas-guzzler of mine on the economy." Gas presently costs about $1.60 a gallon.

If you must bring your left-hand drive, 20-footer with you on your visit to England, be fore-warned. More autos crowd the highways each year in Britain just as in the U.S.A. But there is even less room for them. The fewer big American cars in England, the more appreciative the British will be.

Backing into the street because the car is too large to turn around, a necessary but dangerous tactic.

American cars that didn't survive are stacked in one of the many junk yards in the Mildenhall area.

MSgt Temple talks about driving in England while standing in front of his Yank-Tank.

A narrow suburban street in the town of Mildenhall, typical of every British community.

The sights and sounds of driving

Communication on the Road

by
Major Orlen L. Brownfield
Associate Editor
THE MAC FLYER

This is not an article about Citizen Band radios—CBers seem to do well communicating on the highways and freeways (though outsiders sometimes have problems with the colorful, often abusive, vernacular). No, this is about the sights and sounds of driving and how to use them to your benefit.

Most of us who slip behind the wheel, be it in a Lotus or Pinto, feel we're at least adequate drivers (some of us approach the skills of Parnelli Jones or Richard Petty)—it's the other driver that we worry about. As well we should—and we should learn to communicate with the other drivers. Maybe you think you already do. Let's take a short mini-quiz and see.

Question one: How do you react to an approaching car flashing its headlights at you?

Question two: How do you react to a driver approaching you from the rear, blowing his horn?

Question three: How do you react to a car that has just overtaken you and the driver flashes his brake lights systematically for a few seconds?

Question four: A car has just passed you and the driver flashes a left and right turn signal. Is he trying to tell you something?

You probably had a couple of answers to question one. At night, you might think the approaching driver is telling you that your headlights are on bright and you should dim them. If you've already dimmed them, he might be trying to tell you that your headlights are out of adjustment. In any case, he's trying to communicate with you.

If the driver is flashing his lights at you during daylight hours, you might pay no heed at all—"Look at that idiot? What's he doing?" Perhaps he's trying to tell you that you have your headlights on—and maybe you *want* them on. Just check to see that they're on dim; bright lights can blind even in the daytime. But perhaps it is a murky, rainy or foggy day. Now he might be telling you that he can't see *you* very well and you should turn on those headlights (low beam, of course). Remember the old aviator's adage: *See and be seen*—and nothing makes you more visible than turning your headlights on. This is doubly important in rain or cold weather—faulty windshield wipers can make visual acquisition difficult and so can a fogged up back glass. Your headlights will help protect you from the unfortunate driver who can't afford new windshield wiper blades and rear-window defogger.

An additional comment on driving in reduced visibility conditions (rain, dusk-to-dawn, fog, blowing snow, etc): It's *never* a good idea to stop on the roadway. In most states, it's illegal (stop signs or traffic lights excluded) but stopping on the highway in reduced visibility is downright dangerous. Should it become necessary for you to stop your vehicle on the open highway, pull as far off the roadway as possible—never allow any part of your car to extend into the roadway, even an open door. If your automobile is equipped with emergency flashers, use them, but don't use turn signals as a substitute. And if you can't make it clear of the roadway (maybe your engine has quit), *push* the car clear. Get help if you need it but get clear of traffic lanes.

Now, question two. How about the guy coming up behind you, blowing his horn? Do you make an unbecoming gesture and continue on with what you're doing? Before you do, consider this: the horn is a warning device and should be used to signal a possible "sticky" situation developing. Few people overuse the horn as a warning device—the insurance companies will bear this out—so give the guy the benefit of the doubt. The raucous racer approaching you from the rear may have lost his brakes; his blaring horn begging, pleading for you to get out of the way. Don't take it as a personal affront. Get out of the way.

And how about the guy that flashes his brake lights at you after passing? He might be telling you that you have the bad habit of driving with your left foot on the brake pedal, illuminating your brake lights. We call this the "Hydramatic Syndrome;" it confuses the heck out of the driver behind you. "Is he stopping or going?" Hint: Use only your right foot for braking. You can't stop and go at the same time.

Finally, what about the guy flashing his left and right turn signal? Maybe he's testing the circuits, but probably not. He might be saying that you have inadvertently left one of yours blinking. The solution is to check the position of your turn signal lever; the flashing light on the dash might be burned out.

So you see, we can communicate with each other on the highway, even without a CB. These little tidbits can save a life:

1. "Light up" any time visibility is reduced (headlights, not parking lights).
2. Listen and heed warning sounds (this may require you to turn the stereo down below 80 dB).
3. Watch for signals from other drivers—they're trying to help.

NORTON SUPER SHOW

Motorcycles and mayhem equals a Safety Day?

Bases have held Safety Days before . . . you all know the drill. The Commander says you can either attend the safety briefing or work three hours overtime, whichever you want. Four hundred faithful day-shift bodies file out to the designated area where they are addressed by two or three uninspiring speakers about the evils of alcohol and the necessity of wearing a helmet while on your motorcycle. Then, somebody says "Well, thanks for coming guys, we hope you haven't been bothered by us putting on this little presentation at four o'clock on Friday before the three-day weekend." Then 400 bored, sleepy people file out of the stuffy auditorium and grumble their way home . . . and not one of them has really learned a darn thing about safety.

Not Always So. Somebody once said, "For every example, there is an exception." So it goes with the 63d Military Airlift Wing (MAC) at Norton AFB in California. Major C. W. Wells, 63 MAW Chief of Safety, wanted to put on a different type of safety program, and when he got the go-ahead from Col George Powers, Wing Commander, he organized what turned out to be a most successful type of Safety Day.

Billed as the "Super Show," the event attracted over 1,000 Air Force people of all ranks and ages. Instead of making the formation mandatory, a semi-standdown was declared for the afternoon—a fact which did not escape the attention of the troops.

The theory behind the whole day was soft-sell. No lectures . . . no boring speeches . . . just people who are experts in their fields offering a few helpful tips on staying alive.

The show began with a Double A Fuel Altered Roadster firing up about 50 feet from the stands . . . just a little attention-getter, you might say. And believe us, 2,000 horsepower from a supercharged, fuel injected dragster *is* an attention getter!

Then the program settled down to a little more quiet pace. Officer John Savage of the California Highway Patrol introduced Yvonne Chavez of the 63d SPOI, and told the audience that she would be drinking rum-on-the-rocks during the program, but that to earn her allotment, she had to drive through a series of pylons arranged in a complex pattern. Yvonne did an admirable job of negotiating the course and then settled down to enjoy her reward.

Next up were Marland Whaley and Mark Eggars of the Honda Motor Corp. Trials Team. Marland, who has been the American Trials Champion for the past two years, explained about trials riding and why it is one of the most difficult (but safest) forms of motorcycle competition. Then he and Mark proceeded to ride over every object that was placed in front of them, including a jumble of telephone poles and a car. Just another little attention getter, you might say.

When the bike demo was over, Mr. Mike Cunningham of Super Shops Inc. took the mike and gave a fairly untypical tour of the inner workings of drag racing. Like the Honda riders, Mike and his crew are professionals, and they don't have to kid anybody to get their message across. They tell it like it is, and the audience loved it.

Officer Savage again came to the front and explained that since the "volunteeress" had now imbibed some free rum, the least she could do was run the pylon course again and show that only five drinks over the period of an hour and a half couldn't really affect anybody's driving. She said she felt fine, and off she went. Let us just say that the pylons suffered some damage. The audience began to reconsider how only a little booze may affect their driving.

As a program closer, the Fuel Altered, affectionately known as "Nanook," fired up again and made an easy, 180 mph, tire-smoking run on the taxiway in front of the crowd. It was just another little attention-getter, and it closed the show on a bit of a high note.

Great close to another ho-hum Safety Day, right? Not exactly. A rather interesting phenomenon took place. Instead of drifting off to their cars, the

All the best people showed up for the Super Show at Norton AFB. Mark Eggars and Marland Whaley of the American Honda Trials Team are shown plotting how they can ride over an AF bread van without disturbing the occupants.

Why is the Chief of Safety walking around with a bottle of rum in his hands?

This is why the Chief of Safety has a bottle of rum handy. How else could Yvonne Chavez, 63d Security Police Squadron, demonstrate the effects of alcohol?

Crew member says "Go, Nanook" . . .

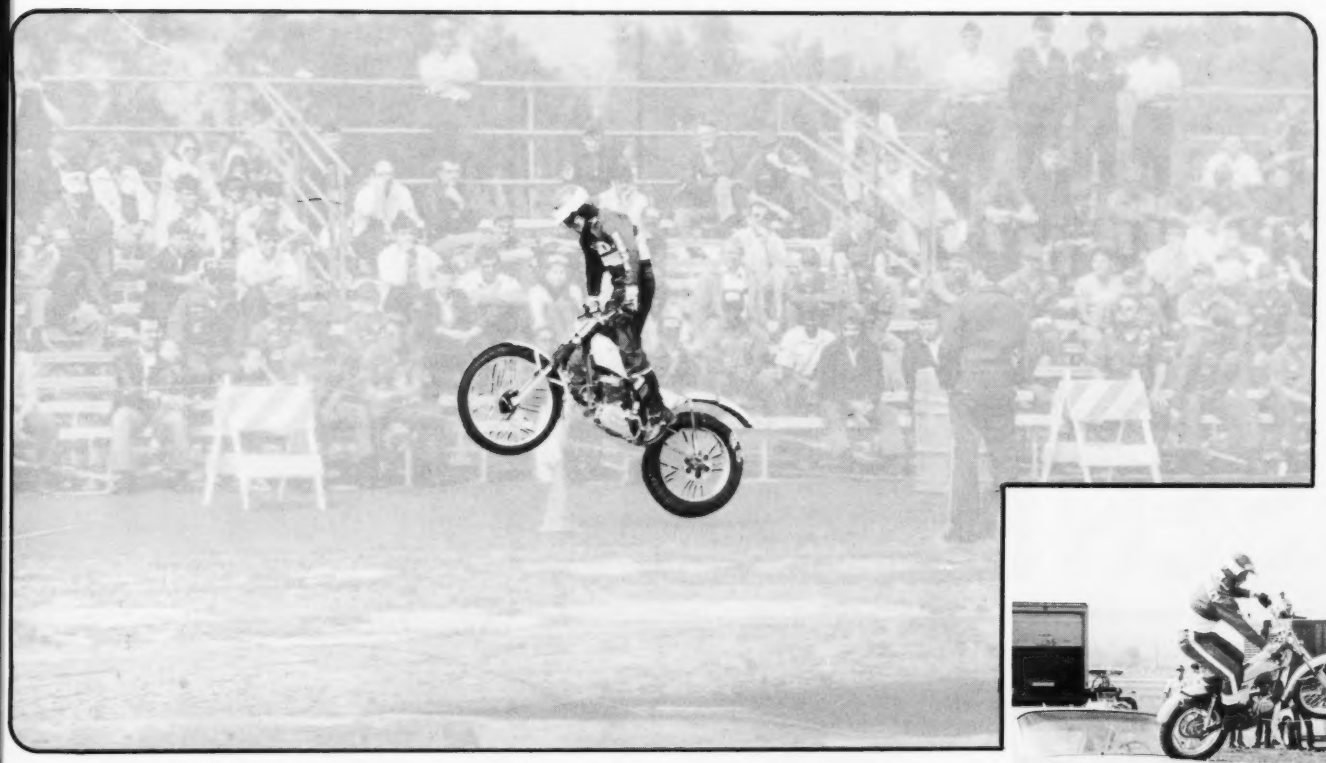
majority of the crowd stayed around (remember, this was free time!) and started talking to Dave Huff, driver of Nanook, and to Marland and Mark.

It took almost an hour for the crowd to leave . . . not exactly a typical reaction from a crowd subjected to almost two hours of safety messages.

Perhaps other installations should consider this type of program. In almost every area of the country there are racers, amateur as well as pro, who would assist a safety office in a program like this. It's nice to have the audience, as well as the safety types, interested in the program.

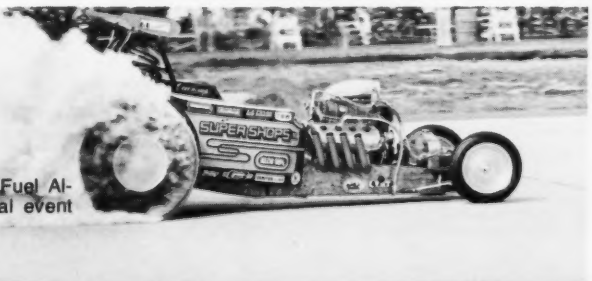
If you've got a couple of safety squares to fill at your base, why not give it a try? You'll like the results.

Marland Whaley of American Honda demonstrates why Trials riding requires the utmost in skill. He also demonstrates why the bread van pictured elsewhere was in jeopardy.



Can *you* get both wheels of your motorcycle off the ground without a ramp? Mark Eggars of American Honda does some tricks (like jumping this pylon without a ramp) that you wouldn't believe. He says he wears protective clothing because he literally feels incomplete without it.

(right, inset)
OK, Marland, ride up to the Chevy and make a right turn at the windshield . . . We grant that this would aid street riders in their "conspicuity," but we don't advise that you try it.



Nanook goes! Super Shops Inc. Fuel Altered roadster makes a great final event for any show.

IN THE DRIVER'S SEAT

TSgt FRED ELSASS

Drag Racing Is No Drag to This NCO

The headlines read "Elsass Wins Title At National Event." The "Wins" part isn't anything new to TSgt Elsass, since he has already accumulated six national drag racing records in International Hot Rod Association competition.

It was the part about "National Event" that really caught our eye here at DRIVER. We knew Fred was good . . . but, a National Event . . . that's a feather in anyone's cap!

The event mentioned was the American Hot Rod Association (AHRA) Winternationals, held in Tucson, Arizona. Fred not only copped a class win in L/SA (L stock with automatic transmission), he did it with a national record run of 15.14 seconds and in the process garnered the points lead in the AHRA Grand American Points Series. He also took home the Stock Eliminator win.

As far as we know, this is the first time an active-duty Air Force man has won a national drag racing event.

Too Fast? Of course, as any racer can tell you, weekends like this don't always happen. Last year, at the Longhorn Nationals in Odessa, Texas, Fred beat himself! At that race, Fred had to "dial-in" his E. T. bracket; in other words, he had to predict, *before* he raced, what his elapsed time would be. Fred dialed-in a run of 15.53. Normally, this would pose no problem to Fred, who is as consistent a racer as there ever was, but that time he out-foxed himself and ran a 15.52. His opponent, who actually ran slower than Fred, won, because he didn't "break out" of his dial-in!

Since Early 60s. Drag racing isn't anything new for this Dyess AFB NCO. He's been going after an Eliminator Title since 1960 when he started sanctioned drag racing back in his home state of Ohio. His first car was a '50 Ford, and during his first forays into organized drag racing, he (and the car) went through nine transmissions, one engine, and seven rear ends. His first transmission change took 11 hours . . . the ninth one only one hour.

Later on, Fred teamed up with two other men and campaigned a '52 Henry

TSgt Fred Elsass is one racer who doesn't let loose ends defeat him. As he changes jets in his carb, each unused jet is returned to its own place in a special jet board, built by Fred, and used religiously.

(below)
Some people figure that "stock" class is just that . . . stock. Smoke from the tires indicates otherwise!

J powered by a 283 Chevy. The first time out with the Henry J, Fred got his doors blown off by a gentleman named Eddie Schartman. Mr. Schartman went on to become known as "Fast Eddie," and, although Fred didn't know it at the time, there was no stigma in being beaten by one of the country's top racers.

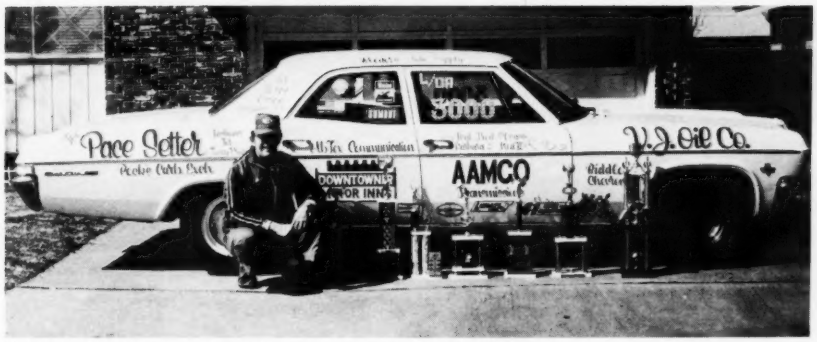
After reading *Hot Rod* Magazine from '64 to '72, Fred decided to re-involve himself in drag racing and purchased a '65 Chevy 4-door sedan, the car that he now uses to break records.

He enters over 20 events per season, and travels more than 5,000 miles to and from those meets. He has raced at tracks in Texas, Oklahoma, Mississippi, Louisiana, Arizona, and New Mexico. Fred has set National records in '74, '75, '76, and '77; was second in points during the '74 NHRA Division 4 season; Stock Eliminator runner-up in October of '75 and again at the Longhorn Nationals in '76.

With the continued help of his sponsors, friends, and family, Fred hopes to continue his winning ways this year and if all goes well maintain his points lead in the AHRA Grand American Series.

We tend to think Fred'll do it . . . as a safe, sane, conscientious racer, he sure deserves it!

Fred is probably the only active-duty Air Force NCO to win a National Drag Racing event . . . good work, Fred!



Not a bad collection of trophies for an amateur! "The Pacesetter" '65 Chevy has seen yeoman duty as a race car for four years now, but is still in as good a condition as when it left Detroit.

(below)
Fred can't understand why some car owners will "jack-up" the back of their cars. In drag racing, traction is everything (just like on the street) and weight transfer from front to rear just isn't as effective when the back end is sticking up in the air.

Training includes lectures on bike safety, types of bikes suited for Japanese streets, maintenance, and the laws. This is as close as Sgt Grinsel gets to a classroom and he gives no written tests.

CLASSROOM ON WHEELS

by SSgt ULRIC WAIR

Through his rear view mirror John Grinsel saw one of his students make a mistake that could have cost him his life. Pulling up at an intersection behind a ten-ton Isuzu truck carrying a bulldozer, Grinsel gave hand signals for everyone to move left and assemble. The trip had been relatively safe until then.

Corrective comments had hardly been uttered when the light turned green and the Isuzu lurched forward. Vibrations from a thunderous crash knocked one of the cyclists from his bike. Six sets of eyes widened in shock as they realized the bulldozer had dug a three-foot hole where two of the cyclists would have been.

Grinsel believes this act of fate was a result of an enthusiastic interest in his student's safety. "If I hadn't taken the time to pull the guy over for a quick counseling, he and I both might be dead," he recalls. "That is one time that I know my interest in my students paid off."

Grinsel is a technical sergeant in the United States Air Force stationed at Yokota Air Base on the outskirts of Tokyo, Japan.

Concern and bike riding come easy to Grinsel. He has owned a variety of bikes since 1954. He sold a Moto Guzzi V7, with sidecar, before leaving the U.S.A. and bought a Honda 350 upon arriving at Yokota in 1971. What he found in Japan was not a motorcyclist's paradise but a headache for which no one had an aspirin.

"I was dumbfounded when I saw the problems bike riders were having here in the Tokyo area. In many cases it could take as long as three months for a man to get his license for a motorbike. At the same time a guy driving a car could get his in only two days. I think what set me off most was when five Americans from the base were killed in bike accidents in two months. It was obvious to me nobody had good answers. Rules and regulations do not prevent accidents! Something inside told me I had to act."

And act he did! Grinsel wrote a brief but concise letter to the base commander complaining about the system. "Your motorcycle program stinks," he wrote, "and the following statistics back up what I say." Within minutes after the letter was delivered he was standing at attention in front of the commander.

"I knew what was necessary to put his program on two solid wheels," remembers Grinsel, "and I proposed it on paper. I backed it up with how I, or anyone, could do it at little expense to the Air Force." He looked at me for a long while without speaking, then finally said, "You do it!"

Ten days later he found himself in the base safety office rewriting local regulations and preparing lesson plans, establishing standards which cyclists in the area would have to meet. It wasn't smooth sailing at the begin-

continued

(left, inset)
All American motorbike owners at Yokota Air Base, Japan, are required to have these decals along with a license plate before they are authorized to ride. To get these decals, they must complete SSgt Grinsel's safety school.

Photos by SSgt Mike Creen

(above)
A motorcycle is not entitled to a full traffic lane but is expected to drive on the outside meter of the road.

(right)
In congested Tokyo traffic, the cyclists legally have the option of passing stopped motorists on the curb side (left) or moving to the center and going around. In this case, left-hand passing is most advantageous.

(below)
In Japan, it's legal to pass on either side.

ning because Grinsel and his new methods were unproven. He was given a six-month trial period while his course paralleled one run by the motorcycle club on base. Each applicant could choose either course, which worked well for Grinsel.

"After the school had been running for only three months, I must have received about 50 letters of commendation from people who realized what I was trying to do," says Grinsel. "At the same time a man licensed by the other school was killed on the highway. That put an end to the other course. With a quick adjustment of my trial period, I was given the job of Noncommissioned Officer in charge of Yokota's driver school and motorcycle training."

Four years have passed since Grinsel's first students were graduated from his motorcycle course—and in that time there have been no fatalities among the more than 1500 riders completing the course. He feels the guys that graduate from his school deserve the real credit for this record. "No one that has been through my class has killed anyone or himself with a motorcycle. We have not had many serious accidents where the student has been at fault. I doubt if anybody can touch that kind of a record," Grinsel says proudly. "I am not with these guys when they leave my school; they are out there on their own and they just aren't having accidents."

Whether it was Grinsel's sound judgment in the program or just plain luck accounting for no fatalities, his safety school could well be called unorthodox by many.

Under the old system, all newly-assigned people desiring a driver's license had to attend a two-hour driver course. Each cyclist had to attend an additional two days of class sessions for the bike license. "The students were never shown how to do anything, but just took tests." His course, he says, is designed with a 180-degree twist. "My school does not have a written test, or class sessions. I give all of my instructions out in the field. I have their undivided attention and what I need to cover can be said there. Also, they can't go to sleep on you. Half of my classes are conducted on the military facility and the other half off the base, in traffic, where real situations happen. All of it is done 'in the saddle'."

The Japanese drive on what some Americans consider to be the wrong side of the road and many Americans have difficulty in overcoming the impulse to drive on the right. Compound this with the narrowness of many Japanese streets, blind corners, zig-zag street patterns, and unusual laws, and you have a difficult situation for even the advanced driver. If you consider the novice bike rider training on these same streets, what would you have?

"When I arrived in Japan for the first time, 13 years ago, I had about 200,000 miles of motorcycling behind me in about 20 countries," says Grinsel. "I would like to think that I was a good driver then but there were things I had to relearn. One of them was that you don't get proficiency by riding on-base to practice for off-base.

"I try to put myself in the shoes of the guy coming into this environment. Some are apprehensive or unsure of themselves. The only thing I want them to know when they show for training is where to put the key. From there I take over. I have gone on the streets and on the freeway with something like 1500 people, with no injuries, no accidents. That adds up to something like a hundred and fifty thousand student miles, with novices, in Tokyo traffic."

Visiting one of Grinsel's courses, probably the first thing you will hear is a detailed explanation of the cycle. Such things as the crash guard, wind shield, and saddle bags are discussed. The conversation goes down to things like mud flaps. Drinking and driving is another subject discussed as the trainees, with bikes, stand in frontal formation. Grinsel gets down to business when it comes time to check each student's cycle before they start rolling. He goes from one person to another, corrects minor malfunctions and explains safety hazards to the group. Comments between Grinsel and his students fly back and forth. For a final test, Grinsel will ride each student's bike around the training area to find anything he might have missed.

He has primary control over the motorcycle inspections at Yokota and willl quickly tell anyone that he does not tolerate junk being ridden around the base. "In order for a bike to pass the base inspection," comments Grinsel, "it must be in the same operating condition as when it left the factory. It has to be perfect mechanically. If it is old and worn out, it isn't going to make it. If it is new and improperly adjusted, it isn't going to make it either. In Japan, modifications on a bike are forbidden by law so we don't have choppers, extended front ends, or super high handle bars."

An hour-and-a-half into the course, Grinsel gets down to what he calls "more driving and less talking." Starting with how to sit on the cycle, he works his way through the rudiments of his course. Grinsel first demonstrates a new technique. When all seem to understand the movement, each student tries it with no pressure of correction until he gets the feel of the technique.

By the time the group journeys off base they have worked half of the previous day on riding double and braking. Grinsel feels that the latter is most important. At this point, tension can be seen among the students as they anticipate the challenge ahead.

"For the first 30 minutes we are riding off-base I don't say anything," says Grinsel. "We just ride single file through the traffic and then we stop and talk about it. Everyone has a comment, even the less talkative ones. We start again, and when I think it's necessary, we'll stop to make a correction." Stopping and starting are frequent, sometimes after traveling only a hundred feet.

Each student gets a chance to follow him for first-hand learning purposes. Over the years Grinsel has picked certain routes of travel which he feels will teach the student something without applying too much pressure.

Japanese roads, for the most part, are pretty congested from early morning to midnight—from large trucks to hand-pushed carts. All have some rights on the road, but these rights differ. For example, the speed limits vary for different size bikes and the car. A bike under 50cc may only go 30 kilometers an hour (about 18 mph); up to 250 may go 50 kph and anything larger may go 60. A car's normal speed limit range is between 40 and 50 kph, but may get up to 80 on the express way.

"A small motorcycle here is not entitled to a lane of traffic," Grinsel tells his students, "and must drive on the outside meter of the road. The dumbest thing you can do here is to fail to go fast enough. Because the motorcycle is not wide enough to block a truck, you pretty much have to go as fast as the truck wants you to go. If you don't, you'll get run over."

Grinsel doesn't advocate breaking laws, but he feels that in some cases

continued

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it is a matter of survival. "I am telling people to do things contrary to other safety programs. At other schools you are never told to go fast, but sometimes it's the only way to stay alive here. If you are on a road where the speed limit is 60 kph and you're on a bike that's 50cc, you're only supposed to do 30. That means that everyone is going to blow you in the weeds."

Another important subject stressed during the phase of his course is passing. Cyclists in Japan have one thing going for them. It's legal to pass on either side. Moving to the center (right) and going around is called "overtaking and passing." When moving to the curb (left) and going around, the action is simply called "overtaking."

One of the safest times for a bike rider on the Japanese roads is in the rush hours, when the traffic is so congested it isn't moving. Then the technique of "lane splitting," illegal in the U.S.A., works well in Japan, Grinsel notes.

"You normally do not pass anyone while his car is moving. When the traffic stops because of congestion, you creep up to the car's left side at 8 kph and overtake about 20 of them. Nobody can possibly hit you. The only thing you have to worry about is someone opening a door."

It takes a certain amount of skill to do anything well, and bike riding is no exception. Most people work at developing natural reactions to avoid abrupt happenings, such as braking if someone pulls out in front of them. According to Grinsel, "A rider should always expect the unexpected and act accordingly. I teach that if you are going at a good rate of speed and someone pulls out, drive around him. I know it's an unnatural thing to do, but you train yourself to be capable of the unnatural."

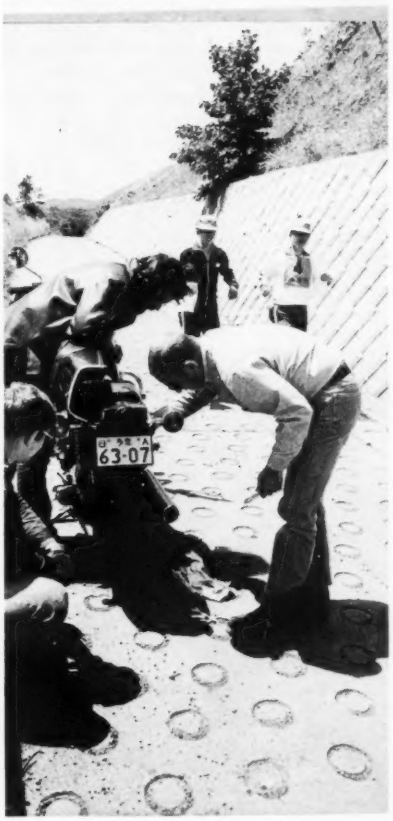
Being unnatural or just being different, Grinsel's motorcycle school has accomplished favorable results since its founding. In 1973, he received the Air Force Chief of Staff Individual Safety Award for his school. This honor may be given yearly to only four individuals, recognizing significant contributions to the Air Force safety program. His concern for people that ride motorcycles and efforts to keep them safe greatly contributed to these results.

"What I've done," said Grinsel, is take a program which nobody was able to work effectively before, eliminate some of the unnecessaries and make it work. I honestly believe I convince my class I am interested in what they want and what they are doing.

"When a big Isuzu truck is breathing down a guy's neck, he must instinctively do the right thing. No written test, no amount of harping on my part will get that through his head. But if he gets out of the way properly, then what I have taught him was worthwhile."

Staying alive and out of the hospital by riding safely is the name of Grinsel's game. At the end of his course the cyclists are ready to take their place in the motorcycling world. If they remember what they have been taught, they have little trouble. One thing is for sure, they've got a big head start over the bulk of riders who buy a bike, pay their money, get the keys and a fond farewell from the dealer.

The student riders weave in and out of the cones to practice gas and clutch coordination while learning to lean the bike and maintain control.



(right)
Grinsel demands a bike be in the same operating condition as when it left the factory. It has to be perfect mechanically. He not only checks every machine, but rides each one around the training area to be sure he hasn't missed anything.

UPDATE
motorcycle laws

Riding your motorcycle across a state line is no big thing as long as you're still street-legal. Because riding and equipment laws vary widely from state to state, however, you may be subjecting yourself to a traffic citation and stiff fine or, worse yet, jail and/or a law suit if you're involved in an accident. Ignorance of the law in another state rarely is an acceptable excuse to a judge or jury.

To help keep you and your bike legal, DRIVER is publishing the following chart of current regs state-by-state as prepared by the legislative staff of the American Motorcyclist Association. Note that in some states special conditions have been established in place of previous helmet laws. In addition some laws will not go into effect until later this year. DRIVER occasionally receives reports that a state is not enforcing its laws, but as of press time only the Nebraska helmet law was not being enforced. It should be assumed then that motorcycle-related laws in all other states are being ACTIVELY enforced.

Because bikes, riders, and bike-involved accidents are constantly increasing in numbers, most states are continually updating or repealing their laws to conform to new safety standards or to pressure groups, both pro and con. DRIVER therefore cannot guarantee that the following chart is 100% accurate. Neither do we want you to think it necessarily applies to mopeds (motorized bicycles). Your best bet BEFORE STARTING any kind of tour or interstate trip is to PERSONALLY CHECK on local regs.

	Safety Helmet	Eye Protection	Daytime use of Headlight	Motorcycle Operator's License	Passenger Seat	Passenger Footrests	Mirror Left (L) Right (R)	Periodic Safety Inspect.
ALABAMA	X				X		X	
ALASKA	X-8	X		X	X	X	X(L,R)	
ARIZONA	X-8	X		X	X	X	X	
ARKANSAS	X	X	X	X	X	X	X	X
CALIFORNIA				X	X	X	X	
COLORADO	X-1	X		X	X	X	X	X
CONNECTICUT		X		X	X	X	X	
DELAWARE	X-1	X		X	X	X	X	X
FLORIDA	X	X	X		X	X	X	X
GEORGIA	X	X	X	X	X	X	X(L)	X
HAWAII	X-1	X		X	X	X	X	X
IDAHO	X				X	X		X
ILLINOIS		X	X	X	X	X	X	
INDIANA	X-12	X-5	X		X	X	X(L)	X
IOWA		X		X	X	X	X	
KANSAS	X-9	X		X	X	X	X	
KENTUCKY	X	X		X	X	X	X	X
LOUISIANA	X-8	X		X	X	X	X	X
MAINE	X-12		X	X	X	X	X	X
MARYLAND	X-1	X		X	X	X	X(L,R)	
MASSACHUSETTS	X	X		X	X	X	X	X
MICHIGAN	X	X-6		X	X		X	
MINNESOTA	X-3, 8	X	X	X	X	X	X	
MISSISSIPPI	X				X		X	X
MISSOURI	X			X			X	X
MONTANA	X		X	X	X	X	X	
NEBRASKA	X-2			X	X	X	X(L)	X
NEVADA	X	X		X	X	X	X(L,R)	
N. HAMPSHIRE	X	X		X	X	X	X	X
N. JERSEY	X-1	X		X	X	X	X(L,R)	X
N. MEXICO	X-3, 8	X-3		X	X	X	X	
N. YORK	X-1	X	X	X	X	X	X	X
N. CAROLINA	X		X		X	X	X	X
N. DAKOTA	X-1			X	X	X	X	
OHIO	X	X		X	X	X	X	
OKLAHOMA	X-8	X			X	X	X(L,R)	X
OREGON	X		X	X	X-7	X-7	X	
PENNSYLVANIA	X	X		X	X	X		X
RHODE ISLAND		X		X	X	X	X	X
S. CAROLINA	X-1	X	X	X-7	X	X	X	X
S. DAKOTA	X-3,8	X		X	X	X	X	X
TENNESSEE	X-10	X	X-11	X	X	X	X	
TEXAS	X-1			X	X		X	X
UTAH	X-4, 8	X-4		X	X	X	X	X
VERMONT	X-1	X		X	X	X	X	X
VIRGINIA	X	X		X	X	X	X	X
WASHINGTON	X	X	X	X	X	X	X(L)	X
W. VIRGINIA	X-1	X	X		X	X	X	X
WISCONSIN	X	X	X	X	X	X	X	
WYOMING	X		X	X	X	X	X	X
DIST' COLUMBIA	X	X		X	X	X	X	X
PUERTO RICO	X	X		X	X	X	X	X

Legend:
X : indicates laws currently in effect.
X-1: reflectorization required.
X-2: not currently enforced
X-3: repealed effective July 1, 1977. for riders & passengers 18 and above.
X-4: repealed effective May 10, 1977.
X-5: must have in possession.
X-6: required at speeds above 35 mph.
X-7: in effect July 1, 1976.
X-8: under 18 yr. old only.
X- 9: under 16 yr. old only
X-10: also requires crash bars for over 750cc, and under 18 yr. old operators.
X-11: effective July 1, 1977.
X-12: repeal legislation pending.

the backyard mechanic

back to basics

spark plugs

We don't think too many people will quibble with the statement "The efficiency of any engine—indeed its ability to operate at all—is directly dependent on the ignition qualities of a small component that has no moving parts—the spark plug." That quote comes from Champion Spark Plug Co., and although plugs are their business and they may be a little biased about them, they are absolutely correct.

How important are spark plugs in relation to engine performance? Well, in a test conducted by Champion and certified by the United States Auto Club, gasoline mileage is as-is cars was measured and then measured again with a change of spark plugs being the only modification . . . the installation of new plugs resulted in a mileage increase of 4.92% at 35 mph and a 3.44% increase in a normal varying speed situation.

Just a plug change also resulted in a 38.16% improvement in HC emissions. A complete tune-up yielded a 66.37% improvement in HC emissions and an increase of 14.45% in mileage at 35 mph.

Pretty impressive statistics huh? Yes, and they illustrate that ignition systems in general can provide the most startling difference in engine performance when not operating correctly.

A spark plug is an electrically-operated mechanical device that is used in the cylinder head of an internal-combusion engine to ignite the fuel/air mixture inside the combustion chamber.

"How does it work?" We thought you'd ask that. It's very simple, really. The center electrode is insulated from the shell by a ceramic insulator such as porcelain. The side electrode is fastened to the plug shell which is grounded to the cylinder head. Current flows from the distributor, down the plug wires, to the center electrode. The current then flows down the center electrode and jumps the air gap to reach the side electrode. This produces a spark which ignites the air/fuel mixture in the cylinder.

Not much to it really . . . unless you consider that the terminal end may be ice-cold while the firing tip, only three inches away, is exposed to flame temperature in excess of 3000 degrees F; the plug must seal off the incredible pressures involved in combustion; and it must do all this millions of times in a highly corrosive atmosphere.

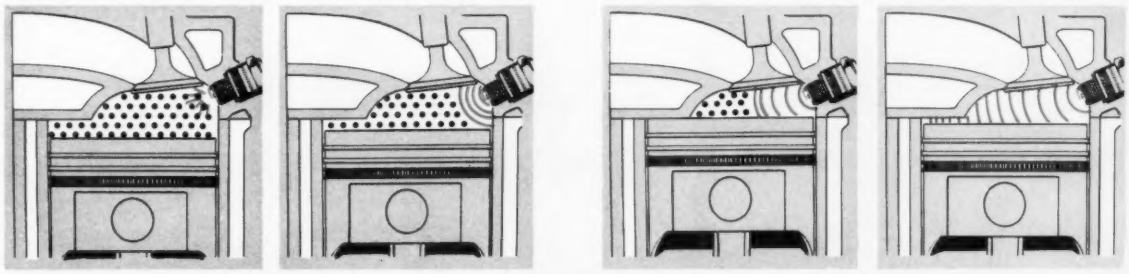
Heat Range. If you've been around any type of racing where engines are involved, no doubt you've heard a mechanic say, "Needs a hotter plug, Harry," or "Hey, Fred, a colder plug'll help keep your engine together at sustained speeds." What they are referring to is a plug's heat range; in other words, is it a hot plug or a cold plug?

A spark plug has to maintain an even flow of heat from its firing end to avoid becoming a source of preignition. At the same time, the spark plug has to run hot enough to burn off deposits formed by the combustion process and that can cause short-circuiting of the plug and subsequent misfiring.

continued

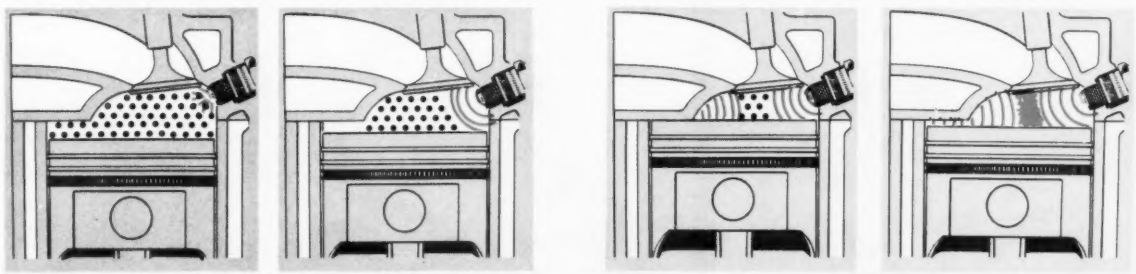
Normal Combustion

Spark occurs. . . . . *. . combustion begins. .* *. . . continues rapidly. . .* *. . . and is completed.*



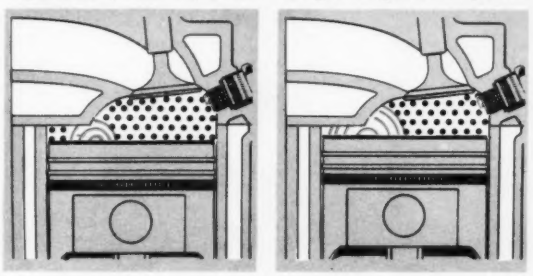
Detonation

Spark occurs. . . . . *. . combustion begins. .* *. . . . . continues. . . . . .* *. . . . . detonation.*

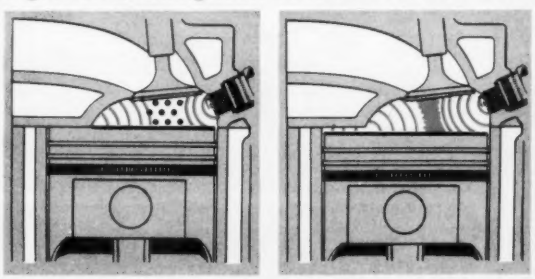


Preignition

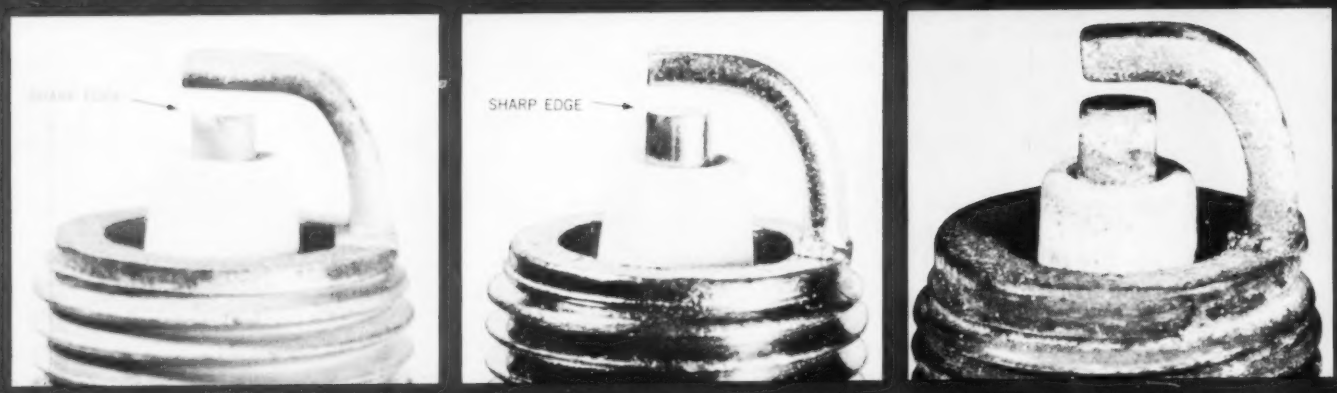
Ignited by hot deposit. *. regular ignition spark. .*



. . ignites remaining fuel. *. . . flame fronts collide.*



Notice how the used plug (left) and the plug that has only been regapped (center) are similar. By just regapping, you aren't really accomplishing anything. (right) **A plug** that has been abrasive-blasted and then regapped offers better performance than just regapping because the insulator deposits have been removed.



(left) **After sand-blasting,** regapping and *filing* plug is almost as good as new. (center) **New plug.** (right) **The typical used plug** is lightly crusted with deposits and will be light brown to grey in color with minimum electrode erosion.

(left) **Oil fouling** indicates clogged oil return passages, bad rings, or clogged PCV valve. Hotter plug may relieve symptoms, but there will still be a mechanical problem in the engine. (center) **Carbon fouled plug** indicates rich mixture, weak ignition, clogged air cleaner, high float level, or sticky carb float. (right) **Center electrode** is too worn to allow regapping. Time for new plugs.

Chart 1

Plug Thread	Iron Heads	Aluminum Heads
10 mm	14 lbs. ft.	12 lbs. ft.
14 mm	30 lbs. ft.	28 lbs. ft.
18 mm	34 lbs. ft.	32 lbs. ft.
7/8 in.	37 lbs. ft.	35 lbs. ft.

continued

Since each engine has different temperature characteristics, each engine must use plugs of a specific heat range. If performance parameters are radically changed from those originally envisioned for the engine, then the plug heat range must be altered.

The hottest part of the plug is the tip of the nose, the part that actually sits in the combustion chamber. Heat flows up through the insulator and down through the shell. The longer the heat path through the insulator and shell, the hotter the plug (and vice versa), because the amount of heat that flows decreases as the length of the path is increased. The "cold" plug, when used in an engine, has a tip which is actually colder than the tip of a "hot" plug. Thus, the cold plug is recommended when the car is driven at full-throttle most of the time. Unfortunately, this cold plug will tend to "foul" (become covered with misfire-causing deposits) at low speeds because it is not hot enough to burn off deposits. The fouling may be burned off if the period of low-speed driving is short, but long periods of operation will bake the deposits on and permit current to leak across the fouled insulator, especially during open throttle operations. Eventually, the deposits become heavy enough to allow all the current to flow through the deposits instead of across the air gap.

Conversely, the hot plug will not foul when driven at low speeds, but if it is driven continually at high speed it will become so hot that the tip of the insulator will burn away, as will portions of the electrode.

Proper Plug Installation. The spark plug gasket is an important factor in conducting the heat from the plug to the cylinder head. Unless plugs are properly tightened and gasket tension is correct, this heat flow may be interrupted. Spark plugs used on some cars (like FoMoCo products) do not use gaskets but rather the plug seat is tapered so that when installed the taper becomes the "gasket."

A cold plug may be ruined by excessive heat if driven hard when it's not tight, and if hot plugs are driven hard when not properly tightened, we guarantee they'll go out to lunch (usually somewhere between Blythe, California and Quartzite, Arizona).

After you've properly gapped the plugs to be installed (use a gapping tool or one of the gauges available from manufacturers) try the following procedure for installing those plugs:

- Thoroughly clean the gasket seating space.
- Screw the plug in by hand as far as it will go.
- Carefully fit a deep socket of the proper size over the plug and pull on the wrench lightly until you feel the gasket beginning to compress.
- Slowly increase the pull on the wrench until you feel the resistance become stiff, indicating that the gasket has been fully compressed.
- Clean the ceramic insulator and top conductor with a dry, grease-free rag to prevent possible shorting.

You should always use a torque wrench when installing plugs, and install to the values listed in Chart 1. These figures are maximum readings and are based on clean and dry threads on plugs and in cylinder heads.

The final tightening of plugs in cast iron heads should be done with the engine at normal operating temperature. Torque plugs in aluminum heads with the engine cold (at room temp). Plug installation in aluminum heads requires care because of the ease with which the threads may be stripped. Easy does it.

Mis-Fire or No-Fire. Assuming that an engine has adequate compression, that fuel and air are mixed in the proper proportions, and that ignition timing and dwell are correct, ignition of the charge may occur any of several ways. Actual misfire may be due to lack of proper mixture in the cylinder. When the spark is lacking, however, it may be due to one of the following reasons:

Tracking ignition: This occurs when the spark "jumps" from one deposit island to another and ignites the fuel charge at some point along the insulator nose. The charge does not actually misfire, but the effect is to retard ignition timing. Power and economy are affected *without* the driver being aware of the problem.

Surface ignition. May occur when some surface in the combustion chamber becomes hot enough to ignite the fuel charge. Usually this occurs before the spark and is then called "preignition." The source may be an overheated spark plug, valve surface, or glowing cylinder deposit. Normally, the driver is aware of the problem since the power loss it causes is very noticeable. Engine damage can also result from preignition.

Wide electrode gap: The plugs' electrodes may be worn so badly that ignition voltage is insufficient to jump that ol' air gap. You *can* recondition a plug in this condition, but we don't advise it. A condition like this greatly increases emissions too, and several plugs in the same engine having this problem may cause catalytic converter overheat because of insufficient burning of fuel.

Bridged gap: Deposits may have bridged the electrode gap so that coil voltage is drained away without a spark occurring. Exhaust emissions are horrendous with this kind of plug problem, but the plug can usually be cleaned.

Flashover: Dirt or moisture, or a deteriorated "plug boot," can cause voltage to short over the outside of the insulator.

Cracked Insulator: High voltage may short to ground through a cracked or broken insulator. Care taken during installation will eliminate most broken insulators. Don't cock the socket or wrench, and try to use a foam-lined plug socket during installation.

Fouled plug: Conductive deposits may form on the insulator surface and drain away ignition charge. Oil-fouling is the most common form of fouling and is sometimes cured by a change to a plug of a slightly hotter range.

Plug Gap Adjustment. Plug gap should be set or reset *only* by bending the side electrode. Don't exert pressure on either the center electrode or the insulator. When measuring gap on used plugs, use a pin-type gauge and not a feeler gauge, because irregularities in the electrode surface can cause incorrect readings. *Always* gap new plugs and *always* regap used plugs . . . *use your tech manual* to get the *right* gap specs . . . don't take your buddy's word for it.

Coil Polarity. If you pull the plugs out of an engine and the side electrode is heavily dished or scooped opposite the center electrode, chances are your coil polarity is wrong. Polarity should always be negative at the spark plug terminal because this considerably decreases voltage required for ignition. This is because of the higher operating temperature of the center electrode . . . if you remember your high school physics, electrons will leave the hotter surface at lower voltage.

Check your coil . . . the negative lead (marked "−") should always run from the coil to the distributor on vehicles with a negative-ground system.

continued

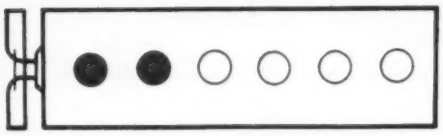


Fig. 1

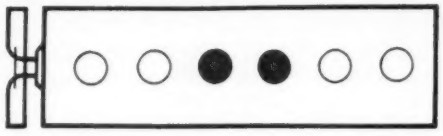
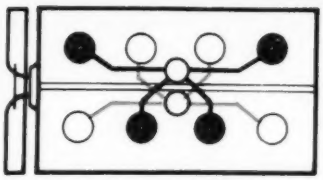


Fig. 2

Fig. 3 ▶



Ash fouling may cause misfire. Could mean engine may need valve guide seal.

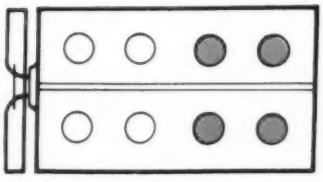


Fig. 4

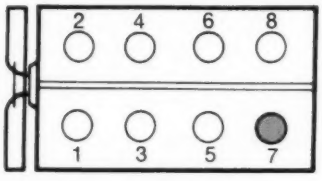


Fig. 5

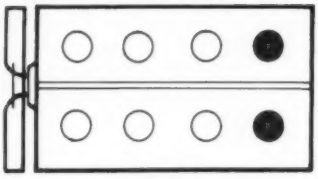
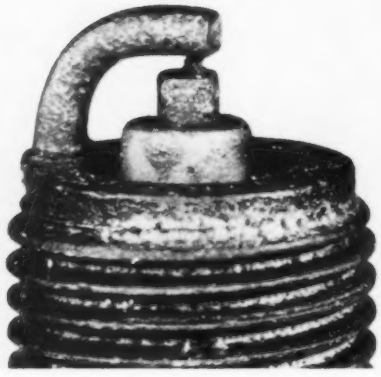


Fig. 6



(left) **Caused by deposits** loosened from hot piston top and splashing onto insulator. Just clean and regap. (center) **Two-stroke** motorcycle engines are most usually affected by gap bridging. Caused by dirty air filter or dirty piston top. (right) **Insulator glazing** occurs because of high heat in the combustion chamber. Try a plug that is one step colder.

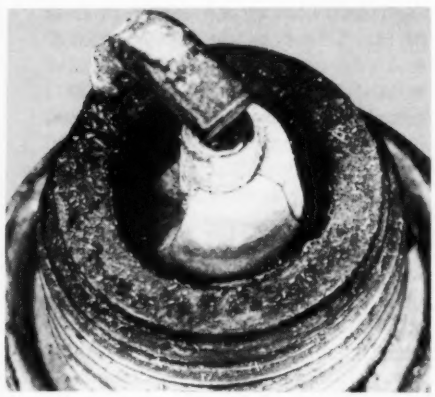
Preignition is a no-no. It's caused by combustion chamber deposits which become incandescent and ignite fuel before the plug does. Other causes include piston scuffing, detonation, cross firing, or plug heat range too high.

Overheated plugs have a blistered, white insulator and very few deposits. Check for correct plug heat range, overadvanced ignition timing, cooling system malfunction, leaking intake manifold, or sticking valves.

continued

Cross Fire. Although it is not a spark plug problem, cross fire is an ignition problem that can cause trouble. Cross fire, or induction leakage, can occur whenever ignition cables are grouped closely together and run in parallel for some distance. Cross fire isn't usually caused by faulty cable insulation but by the magnetic field which surrounds any high voltage conductor. The lead which is carrying high voltage at any given instant tends to induce voltage in an adjacent lead. Cross fire is most likely to occur between consecutive firing cylinders which are located close together in the engine block.

Cross fire can cause engine roughness and damaging preignition or detonation. So, even though it may not look pleasing, run your plug leads in a manner so that they won't run parallel for any distance, and separate plug wires for adjacent cylinders by placing them at opposite ends of the plug wire holder or loom.



Detonation can cause actual plug damage. To stop detonation try retarding the ignition slightly, using higher octane gasoline, and a richer mixture.

Troubleshooting With Plugs. Champion Spark Plug Company notes that close examination of spark plugs can give you clues about the fitness of your engine. Just as important as the examination, though, is keeping the plugs in order according to their cylinder position. The location in the engine may help to locate a problem that otherwise might go undetected.

The diagrams in Chart 2 illustrate some of the problems in the engine which may be located by keeping the plugs in the correct order. Telltale plugs are colored black if fouled and red to indicate an overheat.

Fig. 1 shows two adjacent fouled plugs in a six-cylinder engine. There's a good chance that this is due to a blown head gasket between the two cylinders.

Fig. 2 is drawn so that the two center plugs are fouled. This suggests that raw fuel is being "boiled" out of the carburetor into the intake manifold after the engine is shut off. If the engine is used for stop-start, short distance driving, the two center plugs may foul due to an overly rich "diet." Proper carburetor float level, good needle and seat seal, and the addition of a layer of insulation between the carb base and manifold can help relieve this "foul" problem.

An unbalanced carburetor may produce fouled plugs in an 8-cylinder engine as shown in *Fig. 3.* A good look at the fuel flow on this particular design (consult your Mitchell's or Motor Manuals) shows that if the right barrel was running rich, the cylinders it supplies would foul. The remaining four would show normal plugs.

Finding the back four plugs overheated, as in Fig. 4, may indicate cooling problems. There's a good chance that a good cleaning of the cooling system would restore circulation to the rear of the engine.

One overheated plug (*Fig. 5*) can indicate a leak in the intake manifold near the location of the fouled cylinder. Also, check the firing order. If the overheated plug is the second of two adjacent, consecutive firing plugs, you could be the victim of cross fire.

Fig. 6 shows a condition you may see occasionally in larger V-8 engines used for light duty . . . the two rear plugs are oil-fouled. If the oil drain holes in the rear of the cylinder heads are clogged due to "sludge," excess oil may be pulled into the cylinders via the intake valve stems. This will probably be noticed in the two rear cylinders first, since the engine slants in that direction. High oil consumption and smoky exhaust when starting may accompany this condition.

Cleaning Used Plugs. To use or not to use . . . that is the question relative to used plugs. Electrode gaps wear away at the rate of .005 to .008 inch during a normal service life of 10,000 miles. Plugs should be replaced if they measure out of these limits. Renewal should be performed only on those plugs suitable for further service, and the following procedures should be followed:

- Remove any oil deposits with a safety solvent and dry plugs thoroughly.
- Open the electrode gap wide enough to permit cleaning and filing.
- Use an abrasive cleaner (sandblaster) to remove combustion deposits on both the electrodes and the insulator, and then use clean air (while wearing your safety goggles) to blow away all abrasive dust. Clean and dry the threads and connector terminal.
- File the electrode surfaces to restore clean, *sharp* edges.
- Reset gap (remember, bend only the side electrode).

Some people will condemn a plug if it does not spark in a plug tester at an air pressure equal to or greater than the engine's cranking pressure. WRONG! Air pressure as read on a plug tester has little relationship to engine cranking pressure. Why? The plug being tested is cold. In the engine, the electrodes operate at high temperature and require less voltage to fire than when cold.

The tester can't duplicate an air/fuel mixture. Neither does it take into consideration that a plug does not fire at maximum cylinder pressure but actually well ahead of TDC (top dead center).

If you are using a plug tester, follow the instructions to the letter and it will give you a good indication of the condition of the plug . . . don't throw out a good plug because you didn't follow directions.

Not Any More. Like the engine, the modern spark plug is a carefully engineered product combining highly specialized technology in ceramics, metallurgy, and precision manufacturing techniques. It's also very complicated in its function and theory, right?

Well, if you read this article, you should be a little less confused than before . . . and, after all, *that's* the theory behind the Backyard Mechanic Gets Back to the Basics!

DRIVER wishes to thank the Technical Services Division of Champion Spark Plug Co. for allowing us to extract from their excellent technical briefs, and also for the majority of photos used in this article.

BACKFIRE

MOTORCYCLE VS CAR SAFETY

I have read many letters in DRIVER but a recent one provoked me to attempt a little journalism.

It was mentioned that a motorcycle offered no protection to its rider. I can't quite agree wholly with that statement. First a safety-minded rider not only wears a helmet, but also wears leather clothes and boots. His mount is equipped with crash bars and sturdy saddle bags not only to protect him but his equipment as well. These items put a solid substance between the rider and possible hazards should the rider choose to stay on the bike during the accident, which brings me up to my second point.

During an accident a rider may position the cycle between himself and the hazard, thereby supplying that seemingly all important piece of metal that supposedly saves auto passengers' lives. Also a rider may elect to leave the bike and possibly jump to safety.

And lastly a motorcycle has many advantages over a car. Rapid acceleration to take you away from hazards, shorter braking distances as a 300-lb bike is easier to stop than a 3000-lb car, 360 degree visibility, fewer distractions, quicker steering response, outstanding suspension system to keep tire-to-road contact, as well as being able to hear better than a person in an air-conditioned, insulated car.

As an avid cyclist I can't say I'm looking forward to a day when motorcycles are banned from the streets. They seem to fit right in with the energy crisis, pollution problems as well as the urban parking problems. Maybe we should take all the cars and trucks off the road as they are the ones running over all the cyclists anyway.

Sgt Tim Landsman, USA
B2/33 FA
APO New York 09035

HYPOTHERMIA IN THE SPRING?

I have been riding for 10 months now and have noticed a danger many don't think of while motorcycling. It's called hypothermia – lowering of the body temperature. During the winter months this is most expected, but it *can* happen on those balmy 70° spring days and nights. The only precaution I've heard of is to wear some clothes.

I always seem to see the guy in his shorts and T-shirt. Not only can he get some bad scrapes if he falls, but he might ride long enough and lower that body temp . . . too far and he passes out! A buddy of mine did that and broke his neck! He had his helmet on and survived when his head hit the pole. His helmet was ruined.

Keep up the good work.

SrA David E. Weaverling, USAF
1958 Comm Sq
Reese AFB, TX 79489

You are quite right about the dangers of hypothermia. Not only can motorcyclists be subject to chilling of the body core, so can hikers or fishermen or anyone who gets a bit damp and is subjected to blowing wind. Signs of the onset of body heat loss are: uncontrollable shivering, fatigue, stiffness, euphoria or lightheadedness, and finally, unconsciousness. If you encounter any of these warning signs, stop immediately and get warm. Don't try to make those last 20 miles to the house . . . arriving late is better than not arriving at all.

DRIVING IN FLORIDA

Having been stationed at Patrick AFB for the last four years and working at the Kennedy Space Center the last two, I found Capt Ray's article on driving in Florida (DRIVER, Feb '77) quite interesting. However, I am compelled to make a comment.

The article failed to point out perhaps the most dangerous aspect of driving on the peninsula. For some unknown reason, the yellow light on traffic signals tends to be unusually long. I was leaving the base southbound when the traffic light turned yellow in front of me. I brought my Datsun roadster to a safe stop without having to brake excessively hard. After coming to a complete stop and shifting to neutral, I glanced in my rearview mirror and saw that the car that had been some considerable distance behind me had no intention of stopping. I shifted to first and popped the clutch, glanced and saw the light was *still* yellow, and threw the tail of my car out into the intersection just as the other car slipped by. The long yellow was just turning red as he entered the intersection. I now instinctively check my rearview mirror when deciding whether to stop for a yellow light or not, and frequently stop to find a car ten to 20 yards behind me in an adjacent lane going on through. It is also wise to wait momentarily when your light turns green to allow last minute entries from either side on through.

Incidentally, I credit the maneuverability of my little car and driving skills I developed in frequent autocross competition with that car for getting me out of a sticky situation. Serious autocrossers pay particular attention to their tires, suspension, and brakes in addition to keeping their engines well-tuned. The driving skills developed in driving your car hard can prove invaluable.

Capt John R. Ellis, USAF
6555 Aerospace Test Group
Patrick AFB, FL 32901

Thanks for your valid comments. We're sure they'll be useful to others coming to Florida.

letters to the editor

Address your letters to:
Editor
DRIVER Magazine
AFISC/SEDD
Norton AFB CA 92409

USAF PATCH COLLECTOR

I am a USAF patch collector – been at it about 15 years – and have over 3700 in my collection.

I seem to be able to add fighter, bomber, air refueling, airlift squadrons, and the like to my collection easier than transportation, supply, CE and other support unit patches. I was in the support side of the house for over 30 years and know a "prop wouldn't prop" or a "jet wouldn't jet" without them.

Someday I'll pass on my collection to some USAF installations or military museum for permanent display. It would be an injustice to the thousands of hardworking support people who have come and gone, and to those still in there hacking away, if their organizational patches weren't displayed on the top line, just where they belong.

I would greatly appreciate any patches your readers would send.

CMSgt Harry C. McAllister (USAF Ret)
9407 Walhampton Drive
Louisville, KY 40222

If anyone has any patches they would like to send, please send them direct to CMSgt McAllister.

BUOYANCY COMPENSATORS

In your article last summer on SCUBA you implied that Buoyancy Compensators (BC) were optional equipment. Most reputable diving instructors will not take students in the water without one. *Skin Diver* magazine has repeatedly stressed its importance as a safety device and the major certifying agencies (NAUI, PADI, NSDS, YMCA and LA County) require them.

A new diver should not, however, work under the thought that a BC is a life vest. It won't necessarily keep your head above water if you are unconscious, which is a requirement for a life vest. Even the Red Cross now refers to "life vests" as "Personal Flotation Devices."

As an added note, military regulations *require* that service members interested in this great sport be trained within certain standards, mostly those of the National Association of Underwater Instructors. Professional instruction from reputable sources will usually meet this requirement.

Cpt Thomas M. Seaman, USA
Assistant USNMR, SHAPE
APO New York 09055

SUBMERGED IN WATER

I felt compelled to write a short note concerning an article in your Feb '77 issue which may someday save a life if printed as a correction. On your rear cover was what to do in case your car is submerged while you (and your passengers) are inside. One thing left out of this article is that although the air trapped inside may be breathed for a short time while working on escape, this air is pressurized to the depth of water surrounding it. Therefore, as the victim takes a breath, escapes from the vehicle, holds his breath and swims to the surface, the air in his lungs expands as the water pressure/depth decreases and his lungs likely rupture causing air embolism. Air embolism has been detected in as little as two feet of water depth change, and death recorded in less than 10 feet of water depth. The article should have explained that the victim(s) should exhale air from their lungs on the way to the surface.

Keep up the work on a fine magazine.

Lt Gary L. Stubblefield, USN
Naval Special Warfare Group TWO
NAB Little Creek
Norfolk, VA 23521

NEW CAR PRICES

Here's a money saving tip for readers stationed overseas, and for those who will be assigned overseas.

The price available through the overseas BX "factory representative" is not necessarily the lowest price you can obtain for a new car. I was able to get a lower price by sending the BX price quote to several stateside dealers and asking for their bids for the same car. I obtained the dealers' addresses by writing the Chamber of Commerce of the city in which I wanted to take delivery.

One of the dealers offered a lower price for the new car plus guaranteed I would receive the exact car I ordered at the price promised. Furthermore, the stateside dealer is equipping the car as I want it, which is something the BX factory rep could not do. For example, I want a "remote control outside left hand mirror," and also a trunk light. In order to obtain these items through the BX rep, I would have to order two complete "packages" at considerable additional expense, and which contain all kinds of mirrors, lights, and gadgets that I don't want.

So, by obtaining price bids from stateside dealers, I not only saved on the basic price of the car, I also saved on several options, plus obtained the car I wanted, not the car the BX rep wanted to sell me.

Capt Tobias van Rossum Daum, USAF
8th Tactical Fighter Wing
APO San Francisco 96264

Thanks to a former editor of DRIVER. Glad to see TVR hasn't gotten out of the habit of thinking of you readers.

are you as smart as your

Next time some self-proclaimed car expert begins dominating an otherwise pleasant conversation, try cutting him down to size with this quiz from Car Care Council. Questions are among the *easiest* selected from a sample test created by the NATIONAL INSTITUTE FOR AUTOMOTIVE SERVICE EXCELLENCE, the agency responsible for certification of automotive mechanics.

Car Care Council suggests that amateur mechanics should consider 10 correct as a passing score. Twelve correct is excellent and if your know-it-all friend comes up with 14 or more correct, he has a right to his self esteem.

1. An engine is using too much oil.

Mechanic A says that worn valve guides could be the cause.

Mechanic B says that tapered cylinder walls could be the cause.

Who is right!

(A) A only
(B) B only
(C) Both A and B
(D) Neither A nor B

2. The exhaust manifold heat riser valve is stuck in the open position.

Mechanic A says this could cause poor gas mileage.

Mechanic B says this could cause the intake manifold vacuum to be lower than normal.

Who is right?

(A) A only
(B) B only
(C) Both A and B
(D) Neither A nor B

3. Which of these statements is (are) true about a liquid cooling system?

(1) A thermostat that is installed backwards will cause the engine to run at a lower temperature than normal.

(2) A radiator pressure cap that is *not* fully seated will cause the coolant to boil over at a higher temperature.

(A) 1 only
(B) 2 only
(C) Both 1 and 2
(D) Neither 1 nor 2

4. All of these can cause an automatic transmission to slip *EXCEPT:*

(A) Hardened servo seals
(B) Worn planetary gears
(C) Plugged Sump filter
(D) Faulty one-way clutch

5. Mechanic A says too much clutch pedal free play may cause the clutch to drag when disengaged.

Mechanic B says not enough clutch pedal free play may cause the clutch to slip when engaged.

(A) A only
(B) B only
(C) Both A and B
(D) Neither A nor B

6. In road testing a vehicle you find that the steering wheel shakes from side to side at high speeds.

Mechanic A says that static out-of-balance of the front wheels could be the cause.

Mechanic B says that dynamic out-of-balance of the front wheels could be the cause.

Who is right?
(A) A only
(B) B only
(C) Both A and B
(D) Neither A nor B

7. A car lacks stability on a level road.

Mechanic A says that too much negative camber could be the cause.

Mechanic B says that too much positive caster could be the cause.

Who is right?

(A) A only
(B) B only
(C) Both A and B
(D) Neither A nor B

8. All of these could cause tire wear if not within manufacturer's specs *EXCEPT:*

(A) Caster
(B) Wheel balance
(C) Toe-in
(D) Camber

9. The steering wheel of a car is not centered when traveling straight down the road.

Mechanic A says that the steering wheel should be removed from the steering column and its position changed.

Mechanic B says that the steering wheel should be turned to center and the toe-in readjusted.

Who is right?

(A) A only
(B) B only
(C) Both A and B
(D) Neither A nor B

10. What is the purpose of the master cylinder check valve(s) on cars equipped with drum brakes?

(A) To allow the driver to pump-up the brakes.

(B) To prevent air from entering the hydraulic system.

(C) To prevent wheel lockup by reducing the hydraulic pressure.

(D) To reduce pedal pulsation by controlling hydraulic pressure.

11. Both headlights on a car are dim in high beam and normal in low beam. Which of these could be the cause?

(1) A poor headlamp ground
(2) A shorted headlamp switch

(A) 1 only
(B) 2 only
(C) Both 1 and 2
(D) Neither 1 nor 2

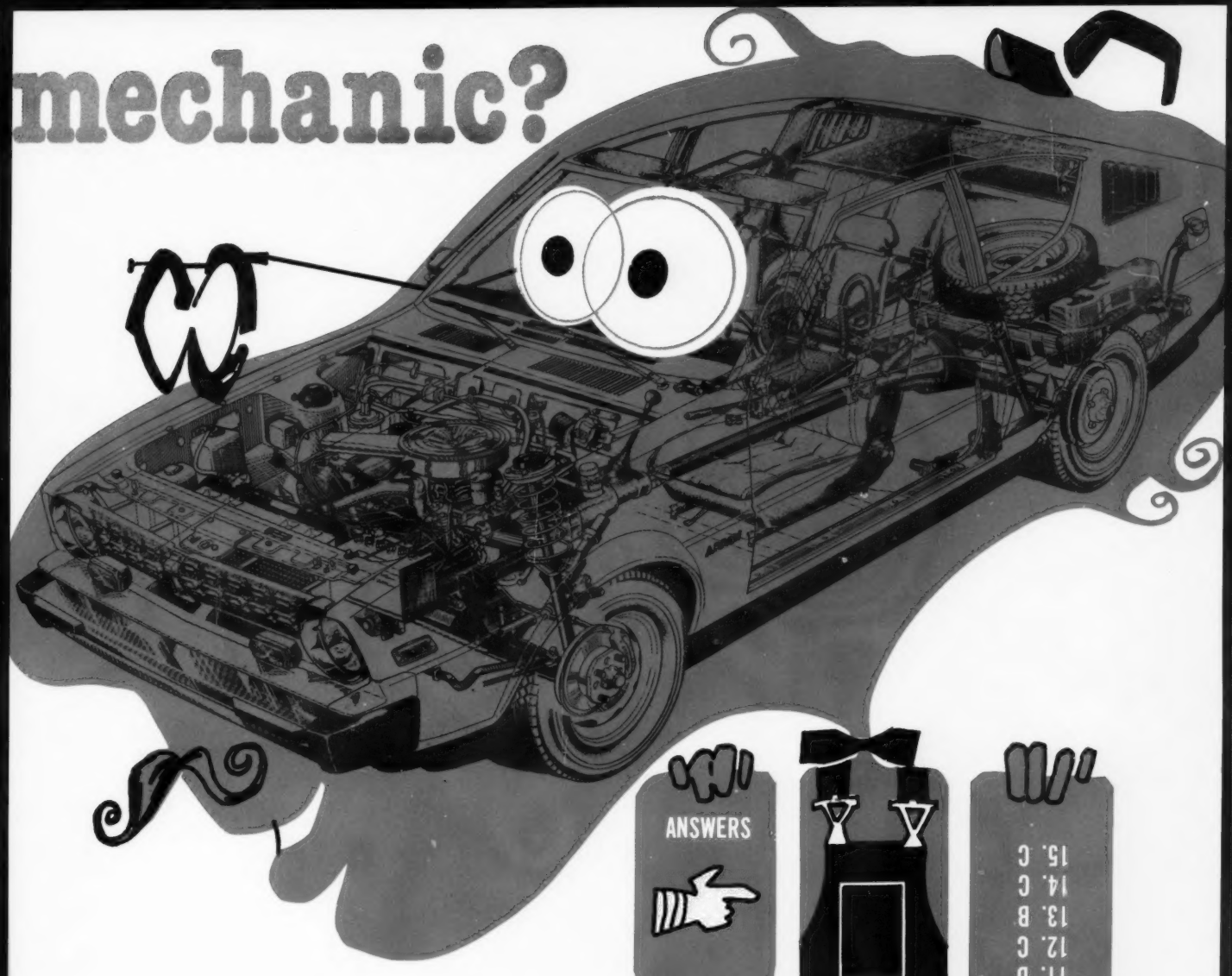
12. Mechanic A says a noisy alternator could be caused by a bad diode.

Mechanic B says a noisy alternator could be caused by a worn bearing.

Who is right?

(A) A only
(B) B only
(C) Both A and B
(D) Neither A nor B

mechanic?



13. While the engine is running, a mechanic pulls the PCV valve out of the valve cover and puts his thumb over the valve opening. There are no changes in engine operation. What could cause this test result?

Mechanic A says the PCV valve could be stuck in the open position.

Mechanic B says the hose between the intake manifold (carburetor base) and the PCV valve could be plugged.

Who is right?

(A) A only
(B) B only
(C) Both A and B
(D) Neither A nor B

14. Mechanic A says the automatic choke is opened by exhaust manifold heat.

Mechanic B says the automatic choke is closed by spring force.

Who is right?

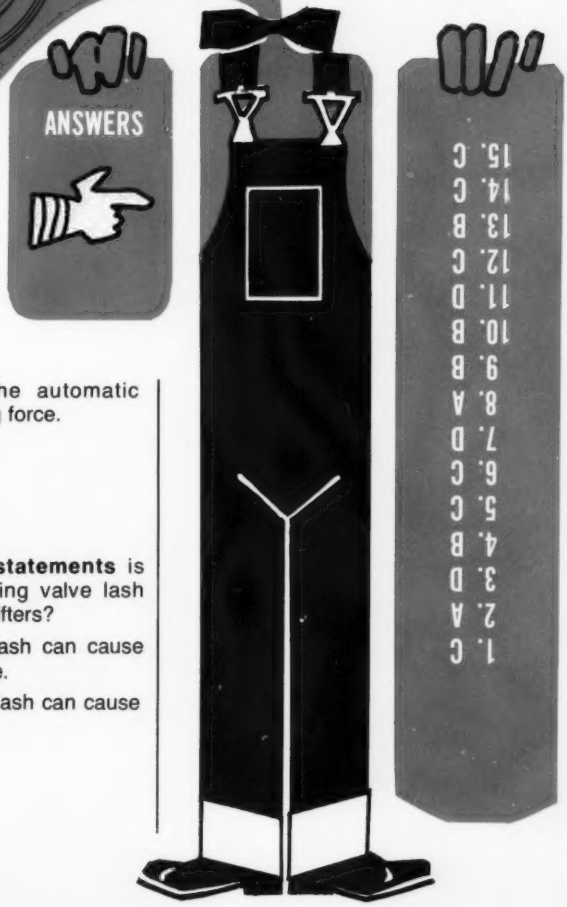
(A) A only
(B) B only
(C) Both A and B
(D) Neither A nor B

15. Which of these statements is (are) true about adjusting valve lash on an engine with solid lifters?

(1) Too much valve lash can cause poor engine performance.

(2) Not enough valve lash can cause valve burning.

(A) 1 only
(B) 2 only
(C) Both 1 and 2
(D) Neither 1 nor 2



☆U.S. GOVERNMENT PRINTING OFFICE: 1977—783-013/7

When your car breaks down on a lonely road, there may be little you can do but raise the hood, tie a handkerchief to the antenna and walk . . . or wait . . . for help.

You also can think about preventing future car trouble with regular checkups and maintenance. Don't wait for symptoms to worsen before looking into the problem.

How do you know when your car needs attention? You don't have to *be* a mechanic to know when it's time to *see* a mechanic.

Be aware of the following:

- Brakes: Noisy . . . Stop unevenly . . . Brake pedal mushy or fading?
- Steering and suspension: Wanders . . . Pulls . . . Shimmies . . . Shakes or bounces?
- Exhaust: Hisses . . . Rumbles . . . Roars?
- Engine: Hard to start . . . Uses gas excessively . . . Sluggish . . . Smokes or noisy?
- Battery: Won't hold a charge?
- Transmission: Slips on shifting . . . Noisy . . . Shifts erratically?
- Lights: Out of adjustment . . . Burned out . . . Turn signals inoperative?
- Windshield wipers: Smear . . . Streak . . . Chatter?
- Body: Rusted . . . Paint deteriorated?

If any of the above apply to your trusted car (or if it has been a while since you've had your car in for service), get it checked today. You might save yourself a long walk, a missed appointment or just plain frustration!

Don't be Carless
care for your car.

MAY IS NATIONAL CAR CARE MONTH

CAR CARE COUNCIL